CLAIMS

1. A production method for a display panel having a microlens array, including a display panel and a plurality of microlenses provided on a light-incident side of the display panel, comprising:

(a) a step of providing a display panel having a plurality of pixels in a matrix arrangement, wherein each of the plurality of pixels has a plurality of picture elements, including a first picture element transmitting first color light and a second picture element transmitting second color light which is different from the first color light;

(b) a step of forming a photocurable material layer on one of a pair of principal faces, being opposite to each other, of the display panel;

(c) a step of exposing the photocurable material layer to light via the display panel, wherein the photocurable material layer is at least partially cured with light which has been transmitted through at least the first picture element; and

(d) a step of removing an uncured portion of the photocurable material layer having been exposed to light, thereby forming a plurality of microlenses.

2. The production method of claim 1, wherein step (a) is a step of providing a display panel such that, among central wavelengths of any color light transmitted through the plurality of picture elements, a central wavelength of the first color light is the shortest wavelength.

3. The production method of claim 1 or 2, wherein step (b) is a step of forming a photocurable material layer which is photosensitive to light of shorter wavelengths than the central wavelength of the first color light.

4. The production method of any of claims 1 to 3, wherein step (c) comprises a step of at least partially curing, with light transmitted through the first picture element, the photocurable material layer corresponding to the plurality of picture elements included in each of the

plurality of pixels; and

step (d) comprises a step of forming a plurality of microlenses arranged in accordance with the arrangement of the plurality of pixels of the display panel.

5. The production method of any of claims 1 to 3, wherein step (a) is a step of providing a display panel such that each of the plurality of pixels has the first picture element in a substantial center thereof.

6. The production method of any of claims 1 to 5, wherein, step (a) is a step of providing a display panel such that the plurality of picture elements include a red picture element, a blue picture element, and a green picture element; and step (c) is a step of at least partially curing the photocurable material layer with light transmitted through at least the blue picture element.

7. The production method of claim 6, wherein step (b) is a step of forming a photocurable material layer which is

photosensitive to light in a wavelength range of no less than 380 nm and no more than 420 nm.

8. The production method of claim 6 or 7, wherein step (c) comprises a step of at least partially curing, with light transmitted through at least the blue picture element, regions of the photocurable material layer corresponding to the red picture element, the blue picture element, and the green picture element.

9. The production method of any of claims 1 to 8, wherein step (c) comprises a step of performing exposure to substantially parallel light while varying an incident angle of the substantially parallel light with respect to the one principal face.

10. The production method of claim 9, wherein step (c) comprises a step of performing a scan with the substantially parallel light in such a manner that a plurality of lenticular lenses arranged corresponding to rows of the

plurality of pixels in the matrix arrangement are formed.

11. The production method of claim 9, wherein step (c) comprises a step of performing a scan with the substantially parallel light in such a manner that a plurality of microlenses arranged corresponding respectively to the plurality of picture elements included in the plurality of pixels in the matrix arrangement are formed.

12. The production method of any of claims 1 to 11, wherein step (c) comprises a step of adjusting a light distribution.

13. The production method of claim 12, wherein step (c) comprises a step of adjusting the light distribution by using a photomask having a predetermined distribution of transmittance.

14. The production method of any of claims 1 to 13, wherein the microlenses each have a flat portion in an apex

portion thereof, the flat portion having no light converging effects.

15. The production method of claim 14, wherein the microlens are lenticular lenses, each flat portion having a size substantially equal to or smaller than a size of an aperture of each picture element of the display panel along a converging direction of the lenticular lenses.

16. The production method of claim 14, wherein the microlenses correspond to respective apertures of the plurality of picture elements of the display panel, each flat portion having a size substantially equal to or smaller than a size of an aperture of each picture element.

17. A production method for a display device, comprising:

a step of providing a display panel having a microlens array as produced by the production method of any of claims 1 to 16; and

a step of disposing a surface illuminant at the microlens side of the display panel.

18. A display device comprising:

a display panel having a microlens array as produced by the production method of any of claims 1 to 17; and

a surface illuminant for emitting light toward the microlens array of the display panel.

19. An exposure apparatus for exposing a photosensitive resin layer to light, comprising:

an optical system for emitting substantially parallel light;

a stage having a receiving surface for receiving an object for exposure having the photosensitive resin layer formed thereon; and

an incident angle controlling mechanism for changing, in a gradual or stepwise manner, an incident angle of the substantially parallel light emitted from the optical system with respect to the receiving surface of the stage.

20. The exposure apparatus of claim 19, wherein the incident angle controlling mechanism is capable of changing the incident angle with respect to the receiving surface at a predetermined speed.

21. The exposure apparatus of claim 20, wherein the incident angle controlling mechanism is capable of varying the speed.

22. The exposure apparatus of claim 21, wherein the incident angle controlling mechanism is capable of varying the speed in a stepwise manner, in connection with the incident angle.

23. The exposure apparatus of any of claims 20 to 22, wherein the incident angle controlling mechanism is capable of changing the incident angle in connection with an irradiation time.

24. The exposure apparatus of any of claims 19 to 23,

wherein the incident angle controlling mechanism includes a mechanism for rotating the receiving surface around an axis extending in a predetermined direction on the object for exposure placed on the receiving surface.

25. The exposure apparatus of any of claims 19 to 24, wherein,

the optical system includes a light source section and a mirror section for reflecting light from the light source section; and

the incident angle controlling mechanism includes a mechanism for changing a reflection angle of the light at the mirror section.

26. The exposure apparatus of any of claims 19 to 25, wherein the incident angle controlling mechanism includes a mechanism for changing a position of the optical system relative to the receiving surface of the stage.

27. A method for forming a microlens array by exposing a

photocurable resin to light by using the exposure apparatus of any of claims 19 to 26.